

# **JLOTS R&D SYMPOSIUM V**

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## **ENHANCED COASTAL**

## **TRAFFICABILITY**

## **AND SEA STATE MITIGATION- ATD**

**CROSS BEACH STABILIZATION**  
**MS ROSA SANTONI**

**SOFT SOIL TRAFFICABILITY**  
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**Engineer Research and Development Center**  
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# OUTLINE

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## → PROBLEM

### □ CROSS BEACH

- EXISTING SOLUTIONS
- POTENTIAL SOLUTIONS

### □ SOFT SOIL

- OBJECTIVE
- STUDY AND RESULTS

### □ SUMMARY

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# SOFT SOIL TRAFFICABILITY *PROBLEM*



**Loose Sand**



**MUD**



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# SOFT SOIL TRAFFICABILITY - LOTS ATD

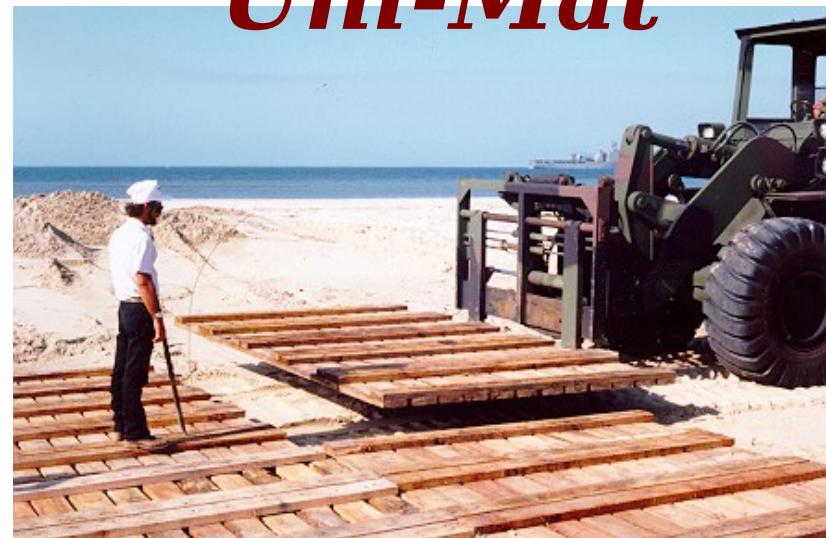


# EXISTING TECHNOLOGIES

## *Sand-Grid*



## *Uni-Mat*



## *Mo-Mat*



## *Steel Mat*



# POTENTIAL TECHNOLOGIES

## Plastic Hex Mat



***PLACEMENT RATE***  
***900 SQ FT / MAN HR vs 250 SQ FT FOR AM-2***

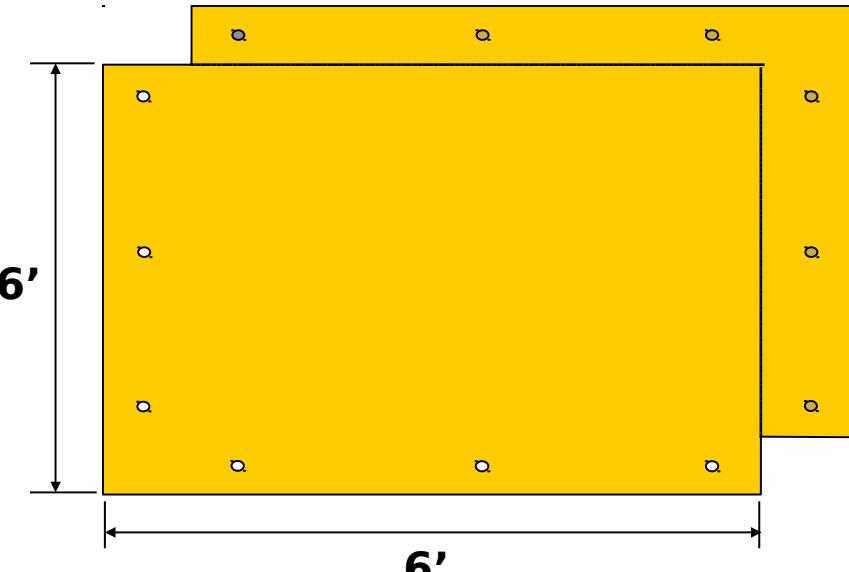


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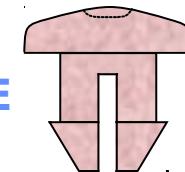


# POTENTIAL TECHNOLOGIES

## Fiberglass Mat



**NEW SINGLE PANEL DESIGN**  
**6 POP-IN PINS**  
**FLUSH SURFACE**

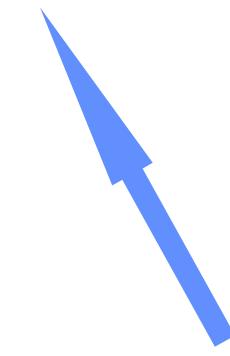


**THREE PANEL STANDARD MAT**  
**12 BOLTS**  
**NON FLUSH SURFACE**



# POTENTIAL TECHNOLOGIES: Mats

## *Performance Under Traffic*



**ALUMINUM HEX MAT**  
**1.1 IN. RUT AFTER 5000 PASSES**

**PLASTIC HEX MAT**  
**2.8 IN. RUT AFTER 5000 PASSES**



**FIBERGLASS MAT**  
**1.8 IN. RUT AFTER 5000 PASSES**



# SAND - FIBER STABILIZATION

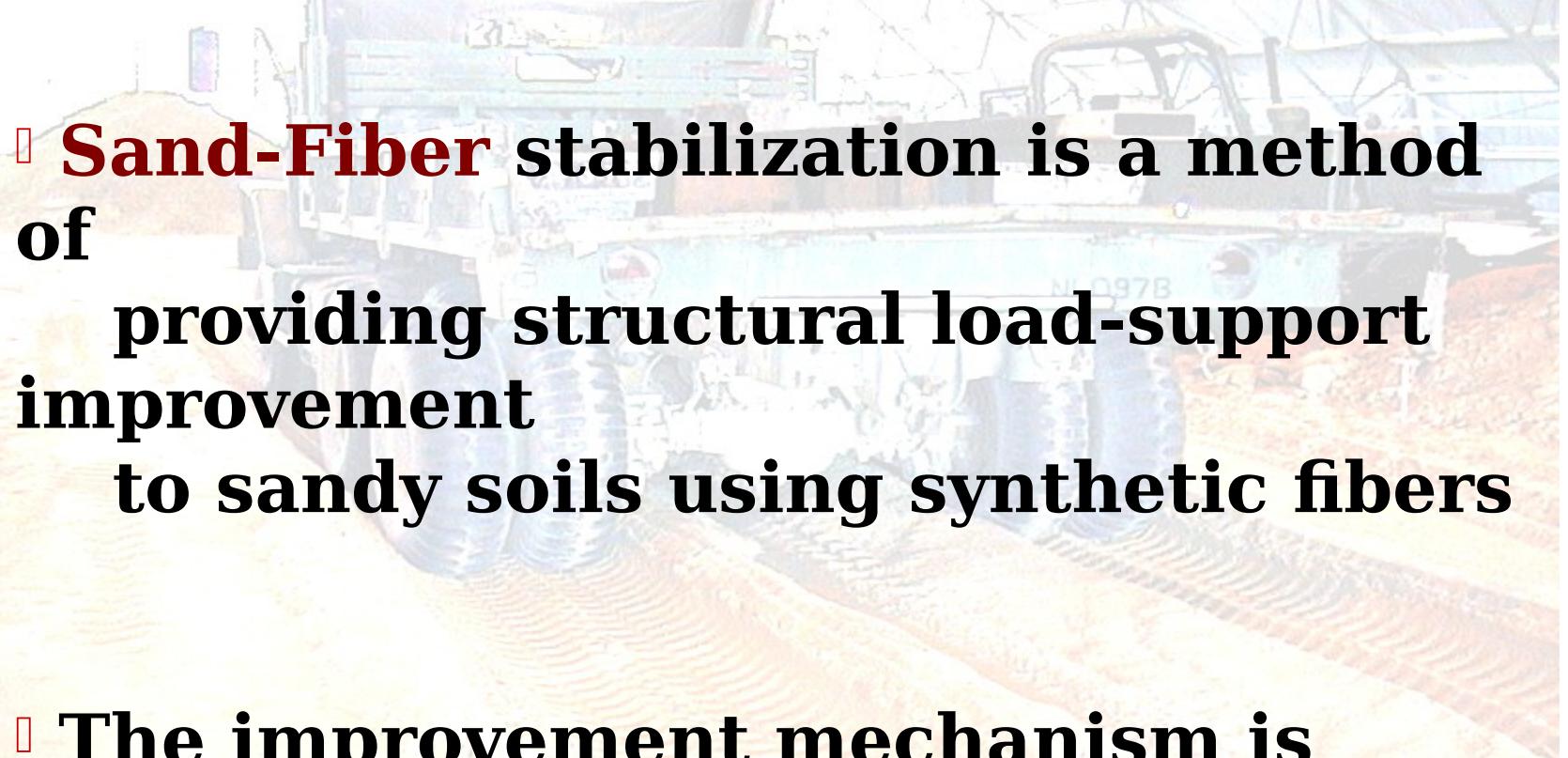


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# POTENTIAL TECHNOLOGIES: Sand-Fiber

## *Definition*



■ **Sand-Fiber stabilization** is a method of providing structural load-support improvement to sandy soils using synthetic fibers

■ The improvement mechanism is increased the shear strength due to sand particle and fiber

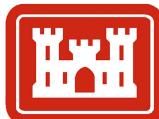


# CURRENT INVESTIGATION

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## *Laboratory Tes*

- Effect of fines on the Sand-Fiber mix
- Triaxial Test
- Unconfined Compressive Test
- Resilient Modulus Test



# POTENTIAL TECHNOLOGIES: Sand-Fiber

## *Laborator*

### → **Test Conditions:**

- 2 Sand Types
- 2 Fine Material Types
- 3 Fiber Types
- Variable Fiber Contents (by Dry Weight of Material)

### □ **Results Obtained:**

- Effects Fine Content
- Effects of Moisture Content
- Repeatability of Test Results

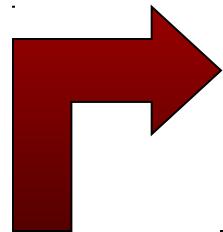


# POTENTIAL TECHNOLOGIES: Sand-Fiber

## *Laboratory Experiment*



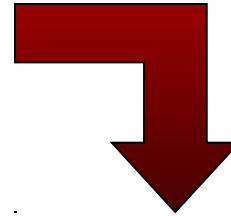
**MIXING**



**COMPACTING**



**TEST  
SETUP**



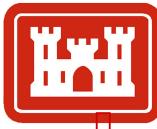
**TYPICAL  
SAMPLE**



# POTENTIAL TECHNOLOGIES: Sand-Fiber

## *Laboratory Major Findings*

- Inclusion of fiber improved load bearing capacity
- Optimum fiber length of 2"
- Optimum fiber content lies between 0.6 to 1.0 % by dry weight
- Optimum moisture content of sample is beneficial but not essential



# **SOFT SOIL TRAFFICABILITY - LOTS ATD**

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***OBJECTIVES*** - DEMONSTRATE NEW SOFT SOIL TRAFFICABILITY TECHNOLOGIES FOR LOTS FOR WET SOILS WITH CBR < 0.5

**UNI-MAT OR PLASTIC-RUBBER MAT OVER WOOD CHIPS OR SAND OVER GEOGRID/GEOTEXTILE**

**FIBERGLASS MAT OVER STYROFOAM OVER GEOGRID/GEOTEXTILE**

**FOR WET SOILS WITH CBR 0.5 - 4.0**

**UNI-MAT OR PLASTIC-RUBBER MAT OVER GEOTEXTILE**

**GRAVEL OVER GEOGRID/GEOTEXTILE**

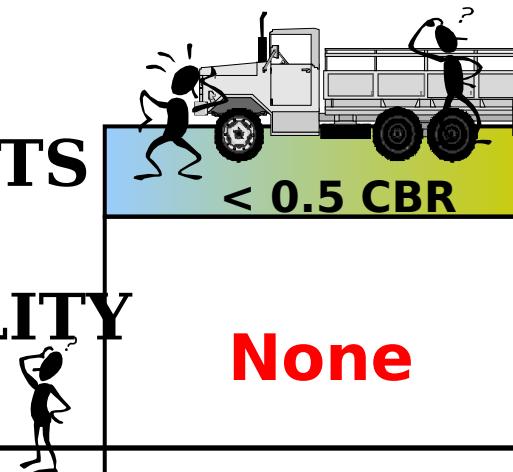
**FIBERGLASS MAT OVER SAND/GEOTEXTILE**



# SOFT SOIL TRAFFICABILITY - LOTS ATD

**APPROACH** - DEMONSTRATE NEW SOFT SOIL SOLUTIONS

EXISTING LOTS  
SOFT SOIL  
TRAFFICABILITY  
SYSTEMS



None

0.5 - 4 CBR

None

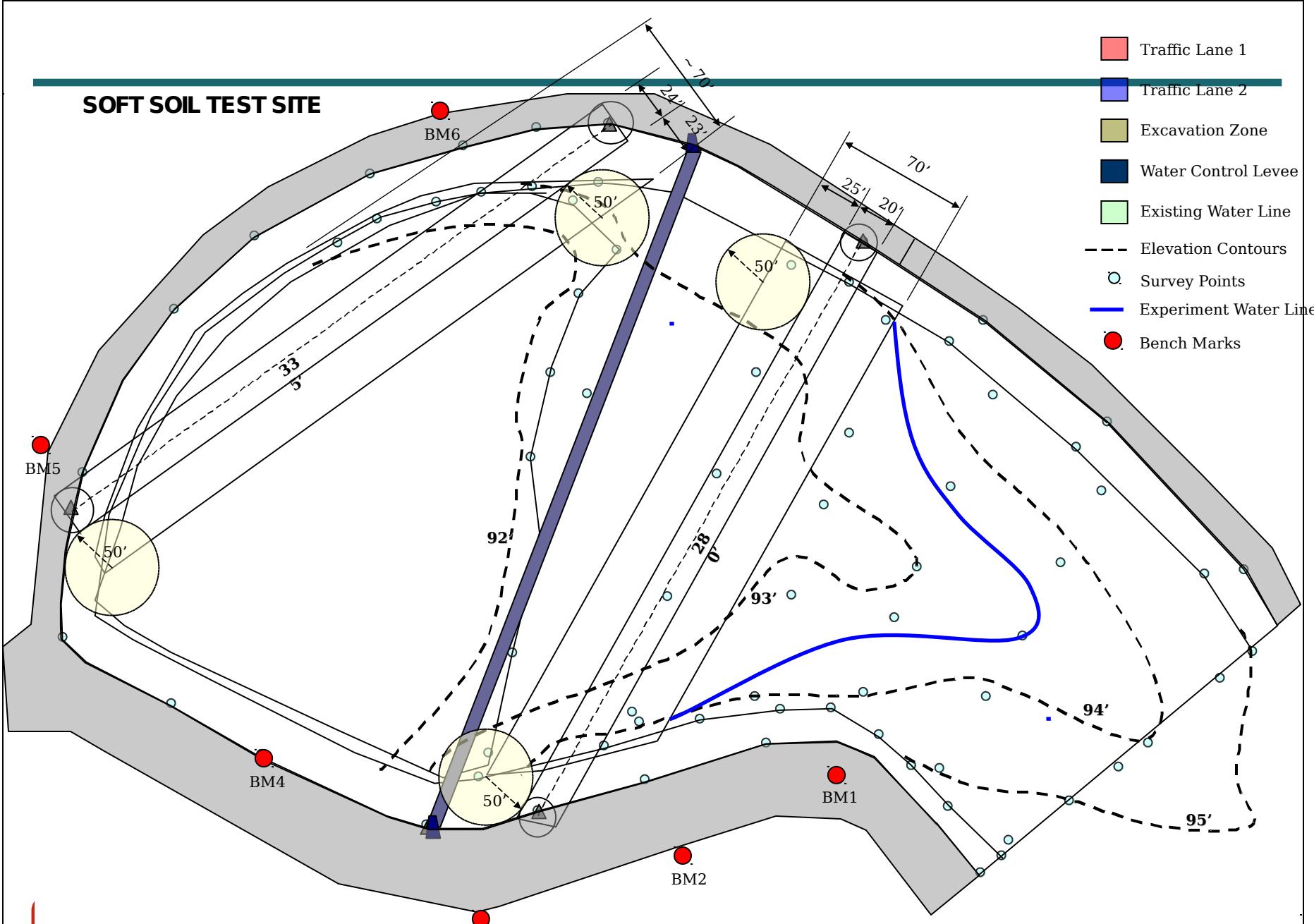
NEW LOTS  
SOFT SOIL  
SYSTEMS



Encapsulated Foam/  
Fiberglass Mat  
  
Uni-Mat/  
Wood Chips/  
Geotextile

Uni-  
Mat/Geotextile  
  
Gravel/Geogrid/  
Geotextile  
Fiberglass  
Mat/  
Sand-Fiber/  
Geotextile

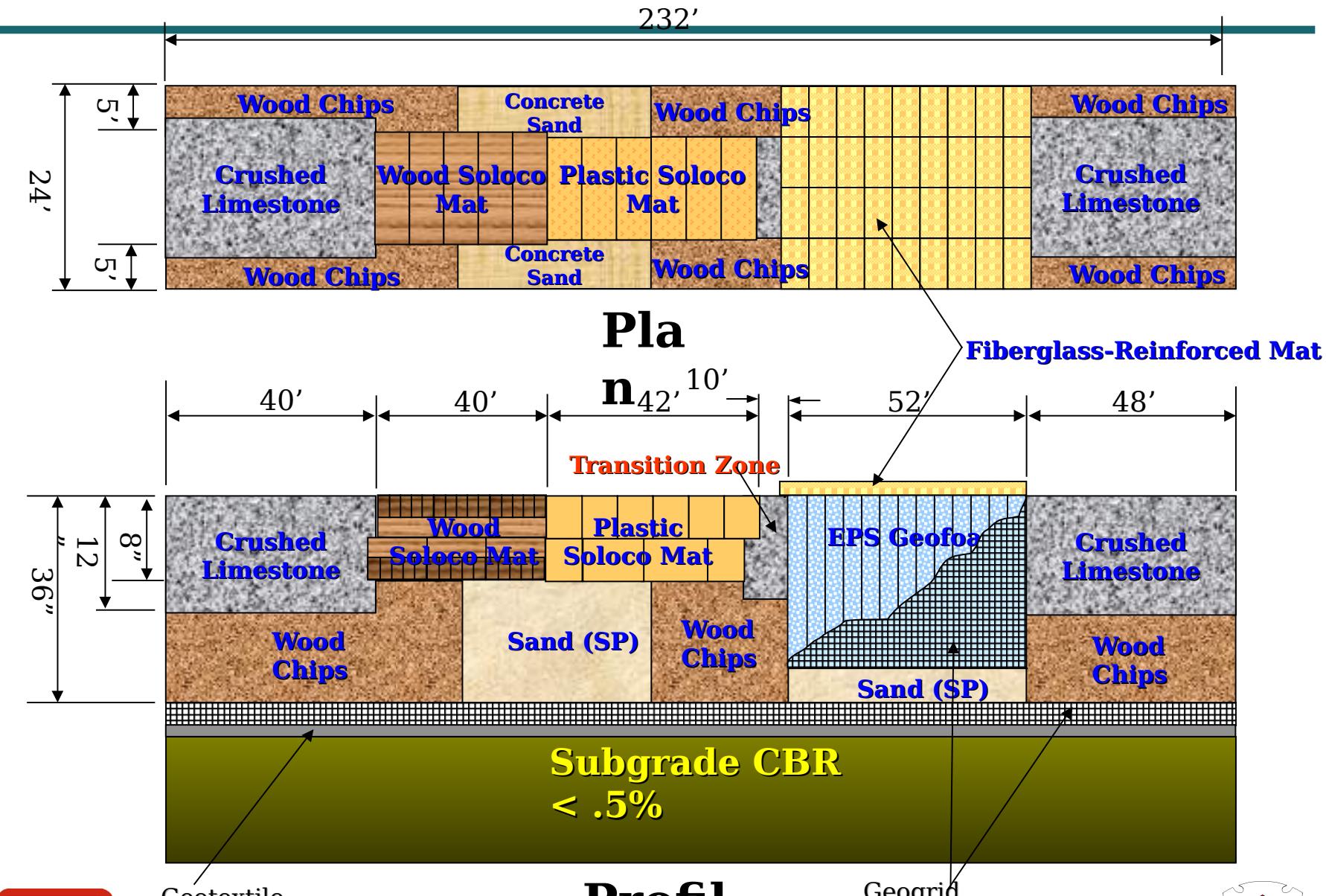




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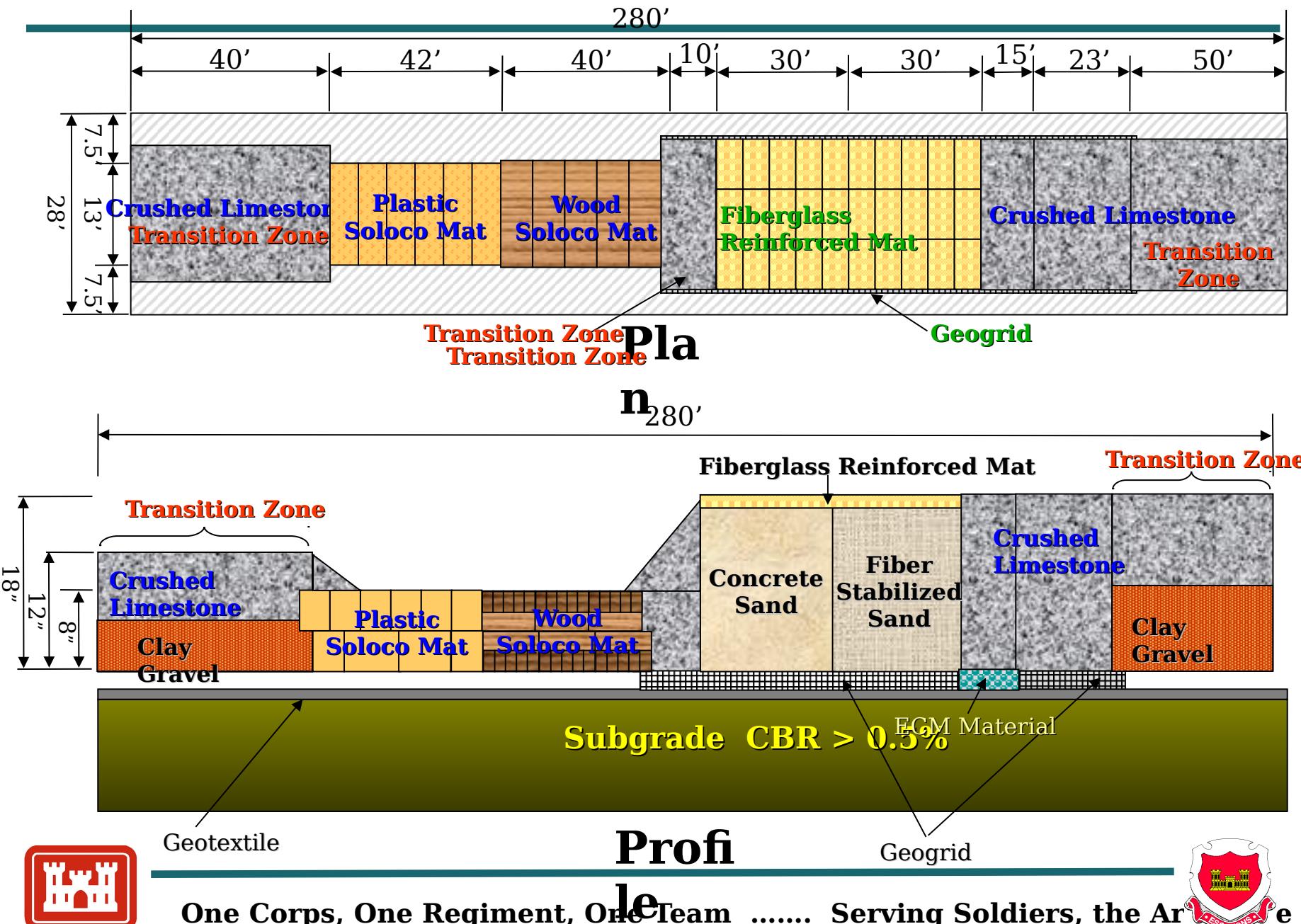
# Soft Soil Test Section - Lane 1



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# Soft Soil Test Section - Lane 2



**Profi**



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# SOFT SOIL TRAFFICABILITY



## SITE CONSTRUCTION



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# SOFT SOIL TRAFFICABILITY



## SITE CONSTRUCTION



# SOFT SOIL TRAFFICABILITY

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**LANE 1  
<0.5 CBR**



# SOFT SOIL TRAFFICABILITY

**LANE 1  
>0.5 CBR**



# SOFT SOIL TRAFFICABILITY



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# SOFT SOIL TRAFFICABILITY

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**RESULTS  
LANE 1  
<0.5 CBR**



# Wood Chipper: Capacity - 75 tons/h



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# Preliminary Traffic Findings

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- **Greater than CBR 0.5%**
  - Plastic and Wooden Mat on Geotextile performed well
  - Crushed Stone over Geogrid/Geotextile performed well
- **Less than CBR 0.5%**
  - Wood chips over geotextile surfaced with gravel, plastic, or wooden mat performed well
  - **Geofoam blocks performed poorly**

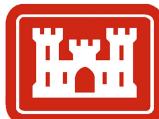


## **PRODUCTS**

### **SOFT SOIL TRAFFICABILITY**

**DESIGN AND CONSTRUCTION  
GUIDANCE FOR:**

- **Soft soil technologies  
for CBR 0.5 - 4.0**
- **Soft soil technologies  
for CBR < 0.5**



## SUMMARY

- Three Potential Solutions for Cross

### Beach Stabilization

Sand Fiber

Fiber Glass Mat

Plastic Hex Mat

- Soft Soil Composite Sections with Potential

Plastic Mat

Wood Chips

